General

Guideline Title

Prevention of fall-related injuries in the elderly.

Bibliographic Source(s)

Crandall M, Duncan T, Mallat A, Greene W, Violano P, Christmas AB, Barraco R. Prevention of fall-related injuries in the elderly: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg. 2016 Jul;81(1):196-206. [76 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The strength of recommendation (strong or weak/conditional) is defined at the end of the "Major Recommendations" field.

Population, Intervention, Comparators, Outcome (PICO) 1

Should bone mineral-enhancing agents be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors conditionally recommend vitamin D and calcium supplementation for frail elderly individuals.

Although the data vary widely in study population and dosing strategy, it is safe to say that most studies favor a higher dose of vitamin D. Usual daily dosing ranging from 400 IU to 800 IU cholecalciferol, while another regimen involves 100,000 IU cholecalciferol every 4 months. Calcium dosing ranges from 1,000 to 1,500 mg/day. This has been shown to improve muscle strength and balance. Sex and racial homogeneity predominated in most of the studies, which may decrease generalizability.

PICO 2

Should hip protectors be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors conditionally recommend hip protectors for frail elderly individuals in the appropriate environment.

It is a known fact that hip fractures cause substantial morbidity, disability, and mortality among the elderly. Evidence shows a modest decrease in hip fractures when worn properly. The major issue with hip protectors is compliance, especially with unattractive hip widening that accompanies usage of protective padding.

PICO 3

Should exercise programs be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors conditionally recommend evidence-based exercise programs for frail elderly individuals.

The data vary in modesty regarding use of exercise programs in decreasing fall-related injuries, mostly due to small sample sizes. Nevertheless, most of the results depict reduction of injuries related to falls, when used in the appropriate setting.

PICO 4

Should physical environment modifications be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors conditionally recommend physical environment modification for frail elderly people.

Owing to difficulty in making appropriate changes to the environmental factors that truly affect fall-related injuries, the data render mixed results in this arena, although grab bars, clutter removal, etc. seem to be of benefit.

PICO 5

Should risk factor screening be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors conditionally recommend frailty screening for the elderly.

Although risk factor screening is not a direct intervention, it may be used as a mechanism of which higher-risk individuals can be targeted for appropriate risk-reduction interventions.

PICO 6

Should multiple interventions tailored to the population or individuals be used to prevent fall-related injuries in the elderly?

Recommendation

The guideline authors strongly recommend risk stratification with targeted, comprehensive risk-reduction strategies tailored to particular high-risk groups.

Although mixed strategies seem to assist in decreasing fall-related injuries among the elderly, the results are hampered by heterogeneity such as differing medication dosages, variable sample sizes, and participant adherence. The largest favorable studies have been conducted in health care systems with universal access and a central payer. In alternative health care systems (or fee-for-service-systems), cost-effectiveness of these comprehensive strategies would have to be assessed.

Definitions

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Definition of Strong and Weak Recommendation

	Strong Recommendation	Weak/Conditional Recommendation
For patients	Most patients would want the recommended course of action.	Most patients would want the recommended course of action, but many would not.
For clinicians	Most patients should receive the recommended course of action.	Different choices will exist for different patients, and clinicians should help patients decide.
For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

	Strong Recommendation	Weak/Conditional Recommendation

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Fall-related injuries

Guideline Category

Prevention

Risk Assessment

Clinical Specialty

Family Practice

Geriatrics

Nursing

Physical Medicine and Rehabilitation

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physicians

Guideline Objective(s)

To assess the scientific evidence regarding falls-related injury prevention strategies among the elderly (age 65 or older)

Target Population

Patients age 65 and older at risk for fall-related injuries

Interventions and Practices Considered

1. Bone mineral-enhancing agents
2. Hip protectors
3. Exercise programs
4. Physical environment modifications

5. Risk factor screening
6. Combined programs

Major Outcomes Considered

Injury due to falls, including fracture, contusion, laceration, hemorrhage

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Inclusion Criteria for this Guideline

Study Types

Studies included randomized controlled trials (RCTs), prospective and retrospective observational studies, case-control studies, and meta-analyses. Case reports and reviews containing no original data or analyses were excluded. No date range was specified so as not to exclude early, salient studies.

Participant Types

The authors included all studies of falls-related injury prevention for participants aged 65 and older.

Intervention Types

The authors included all studies of falls-related injury prevention methods related to their Population, Intervention, Comparators, Outcome (PICO) questions of interest. For PICO 6, they included studies of multiple simultaneous interventions, such as vitamin D plus strength training, tailored to the individual or to a population.

Outcome Measure Types

The authors limited the review to studies in which injury was the outcome, not simply falls. Owing to the heterogeneity of injury reports, all injuries including, but not limited to, fractures, contusions, lacerations, and hemorrhage were felt to be essential to evaluating the literature within the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework.

Data Sources and Search

References were identified by research librarians using the Cochrane Library, the MEDLINE database in the National Library of Medicine, and the National Institutes of Health via Entrez PubMed (www.pubmed.gov) in November 2012 with a simple search in March 2015. The search was designed to identify English-language citations regarding fall-related injury prevention in the elderly. The search strategy was defined a priori to evaluate only those articles in which injury was the outcome, not falls alone. Supplemental digital content 1 (see the "Availability of Companion Documents" field) contains the MESH terms used for the initial search. The articles were limited to humans, clinical trials, randomized controlled trials (RCTs), practice guidelines, meta-analyses, and reviews. A total of 1,830 studies were initially identified.

Study Selection

Case reports and small case series were excluded (n=128). The authors then reviewed the articles for relevance and excluded articles that did not include injury as a specific outcome of interest (n=1478). Articles not relevant to the authors' specific PICO interventions (n=195) were also

excluded. Additional articles were added to the literature summary after reading relevant review articles and meta-analyses (n=20). The final list of 49 articles was reviewed and used to create the recommendations. Each author separately reviewed the evidence to support recommendations using the GRADE methodology in December 2012. Finally, they performed a focused search update in March 2015, during the review and manuscript preparation stages. One additional article was identified and included in the analysis at that time, for a final total of 50 articles reviewed. The study selection process is highlighted in the PRISMA flow diagram for Figure 1 (see the original guideline document).

Number of Source Documents

The authors identified 50 articles regarding fall-related injury prevention among the elderly, addressing our six main areas of interest: bone mineral-enhancing agents, hip protectors, exercise programs, physical environment modifications, risk screening strategies, and combined programs.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Methodology Levels for Rating the Quality of Evidence

Quality Level	Definitions
High	Very confident that the true effect lies close to estimate of effect.
Moderate	Moderate effect; true effect is likely close to estimate of effect but may be substantially different.
Low	Limited confidence; true effect may be substantially different from estimate of effect.
Very Low	Little confidence; true effect likely substantially different from estimate of effect.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction and Management

All studies used for the review were entered into a Microsoft Excel spreadsheet containing information on authors, article title, study methodology, and intervention and outcome measures. A master copy was provided to all reviewers.

Methodological Quality Assessment

The authors used the validated Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology for this study. Each designated reviewer independently evaluated the data in aggregate with respect to the quality of the evidence to adequately answer each Population, Intervention, Comparators, Outcome (PICO) question and quantified the strength of any recommendations. Reviewers are asked to determine effect size, risk of bias, inconsistency, indirectness, precision, and publication bias.

Recommendations are based on the overall quality of the evidence. The GRADE methodology suggests the phrases, "we strongly recommend" for strong evidence, and "we conditionally recommend" for weaker evidence.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The authors used the validated Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology for this study. The GRADE methodology entails creating a predetermined question or set of questions that the literature must answer, in the patient population, intervention, comparators, outcome (PICO) format. The PICO questions were created using a modified Delphi method by the Eastern Association for the Surgery of Trauma Injury Control and Violence Prevention Committee along with the Practice Management Guideline Section.

For this guideline, six topical PICO questions were estimated by the authors as the most salient aspects of injury-related falls prevention.

PICO Questions

Population: Age 65 and older

Intervention: Clinical interventions to reduce fall-related injuries

Comparators: Intervention compared with control group

Outcome: Injury due to falls

PICO Question 1: Should bone mineral-enhancing agents be used to prevent fall-related injuries in the elderly?

PICO Question 2: Should hip protectors be used to prevent fall-related injuries in the elderly?

PICO Question 3: Should exercise programs be used to prevent fall-related injuries in the elderly?

PICO Question 4: Should physical environment modifications be used to prevent fall-related injuries in the elderly?

PICO Question 5: Should risk factor screening be used to prevent fall-related injuries in the elderly?

PICO Question 6: Should multiple interventions tailored to the population or individual be used to prevent fall-related injuries in the elderly?

After completing a comprehensive literature search performed by a university-affiliated research librarian, three independent reviewers screened the titles and abstracts, excluding reviews, case reports, articles in which injury was not an outcome measure, and unrelated articles. The resulting studies were used for the guideline.

Rating Scheme for the Strength of the Recommendations

Grading of Recommendations Assessment, Development and Evaluation (GRADE) Definition of Strong and Weak Recommendation

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For policy makers	Recommended course should be adopted as policy.	Considerable debate and stakeholder involvement needed to make policy.

Cost Analysis

The guideline developers reviewed published cost analyses.

Method of Guideline Validation

Not stated

Description of Method of Guideline Validation

Not applicable

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

Studies included randomized controlled trials (RCTs), prospective and retrospective observational studies, case-control studies, and meta-analyses.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Bone mineral density can be improved with vitamin D and calcium supplementation; vitamin D in particular may also improve muscle strength and balance.
- Hip protectors seem to be modestly effective at secondary prevention of fall-related fractures.
- Exercise may decrease the likelihood of falling in the first place, and then, by improving general health and perhaps bone density, decrease the likelihood of having injury.
- Risk factor screening, while not directly an intervention, may be able to help identify higher-risk individuals for targeted strategies.

Potential Harms

- Of note, for institution-dwelling elderly, several investigators have examined the effects of restraint use for individuals with dementia. While this is not exactly an environmental modification, it is worth noting that restraints do not seem to improve safety and may in fact be associated with more injuries.
- A key issue with hip protectors is compliance, which is generally poor for these devices, and the negligible treatment effect for community-dwelling elderly suggests that the number needed to treat would be excessive for that population.

Qualifying Statements

Qualifying Statements

- The Eastern Association for the Surgery of Trauma (EAST) is a multi-disciplinary professional society committed to improving the care of injured patients. The Ad hoc Committee for Practice Management Guideline Development of EAST develops and disseminates evidence-based information to increase the scientific knowledge needed to enhance patient and clinical decision-making, improve health care quality, and promote efficiency in the organization of public and private systems of health care delivery. Unless specifically stated otherwise, the opinions expressed and statements made in this publication reflect the authors' personal observations and do not imply endorsement by nor official policy of EAST.
- "Clinical practice guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."* These guidelines are not fixed protocols that must be followed, but are intended for health care professionals and providers to consider. While they identify and describe generally recommended courses of intervention, they are not presented as a substitute for the advice of a physician or other knowledgeable health care professional or provider. Individual patients may require different treatments from those specified in a given guideline. Guidelines are not entirely inclusive or exclusive of all methods of reasonable care that can obtain/produce the same results. While guidelines can be written that take into account variations in clinical settings, resources, or common patient characteristics, they cannot address the unique needs of each patient nor the combination of resources available to a particular community or health care professional or provider. Deviations from clinical practice guidelines may be justified by

individual circumstances. Thus, guidelines must be applied based on individual patient needs using professional judgment.

*Institute of Medicine. Clinical practice guidelines: directions for a new program. MJ Field and KN Lohr (eds) Washington (DC): National Academy Press; 1990. pg 39.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Safety

Identifying Information and Availability

Bibliographic Source(s)

Crandall M, Duncan T, Mallat A, Greene W, Violano P, Christmas AB, Barraco R. Prevention of fall-related injuries in the elderly: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg. 2016 Jul;81(1):196-206. [76 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016 Jul

Guideline Developer(s)

Eastern Association for the Surgery of Trauma - Professional Association

Source(s) of Funding

Eastern Association for the Surgery of Trauma (EAST)

Guideline Committee

Eastern Association for the Surgery of Trauma (EAST) Injury Control and Violence Prevention Committee

EAST Practice Management Guidelines Section

Composition of Group That Authored the Guideline

Committee Members: Marie Crandall, MD, MPH; Thomas Duncan, DO; Ali Mallat, MD; Wendy Greene, MD; Pina Violano, MSPH, RN-BC, CCRN, PhD; A. Britton Christmas, MD; Robert Barraco, MD

Financial Disclosures/Conflicts of Interest

The authors declare no conflicts of interest. They did not receive funding for this work.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the Journal of Trauma and Acute Care Surgery Web site .

Availability of Companion Documents

The following is available:

- Kerwin AJ, Haut ER, Burns JB, Como JJ, Haider A, Stassen N, Dahm P, Eastern Association for the Surgery of Trauma Practice Management Guidelines Ad Hoc Committee. The Eastern Association of the Surgery of Trauma approach to practice management guideline development using Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology. J Trauma Acute Care Surg. 2012 Nov;73(5 Suppl 4):S283-7. Available from the Eastern Association for the Surgery of Trauma (EAST) Web site .

Supplemental digital content is available from the Journal of Trauma and Acute Care Surgery Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 22, 2016. The information was verified by the guideline developer on December 5, 2016.

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